

WE CLAIM:

1. A compound comprising Receptor-Associated Protein (RAP) or RAP polypeptide conjugated to an agent of interest.
- 5 2. The compound of claim 1, wherein the agent is selected from the group comprising a therapeutic agent, diagnostic /investigational agent, labeled monoclonal antibody which binds a marker of a CNS pathology, and protein.
3. A method of delivering a therapeutic or diagnostic/investigational agent into the central nervous system by increasing transport across the blood brain barrier (BBB) in a
10 subject in need thereof, said method comprising:

 administering to said subject a compound comprising Receptor Associated Protein (RAP) conjugated to a therapeutic or diagnostic/investigational agent in an amount effective to increase transport across the BBB.
4. A method of treating a disease or condition in a subject in need thereof, said
15 method comprising:

 administering to said subject a compound comprising RAP conjugated to a therapeutic agent in an amount effective to treat said disease.
5. The method of claim 4, wherein the disease or condition is a neurological or psychological condition or disease.
- 20 6. The method of claim 5, wherein the condition or disease is AD, PD, MS, or ALS.
7. The method of claim 4, wherein the condition is a brain tumor or tumor metastases in the brain and the therapeutic agent is a chemotherapeutic agent.
- 25 8. A method of diagnosing a disease in a subject in need thereof, said method comprising:

 administering to said subject a compound comprising RAP conjugated to a diagnostic/investigational agent in an amount effective to diagnose said disease.

9. A method of delivering a therapeutic enzyme to a lysosome in a cell of a subject, said method comprising:

- (i) administering to said subject a compound comprising RAP or RAP polypeptide conjugated to a therapeutic or diagnostic agent;
- (ii) transporting said compound across the cell membrane;
- (iii) contacting said compound with an LRP receptor on said cell;
- (iv) facilitating entry of said compound into said cell; and
- (v) delivering said compound to said lysosome in said cell.

10. A method of treating lysosomal storage diseases in a subject in need thereof, said method comprising:

administering to said subject a compound comprising RAP or RAP polypeptide conjugated to a therapeutic agent, wherein said compound crosses the cell membrane, enters cells and is delivered to lysosomes in an amount effective to treat said lysosomal storage disease.

11. The method of claim 10, wherein the agent is an enzyme deficient in the lysosomal storage disease.

12. The method of claim 11, wherein the lysosomal storage disease is selected from the group consisting of aspartylglucosaminuria, cholesterol ester storage disease, Wolman disease, cystinosis, Danon disease, Fabry disease, Farber lipogranulomatosis, Farber disease, fucosidosis, galactosialidosis types I/II, Gaucher disease types I/II/III, Gaucher disease, globoid cell leukodystrophy, Krabbe disease, glycogen storage disease II, Pompe disease, GM1-gangliosidosis types I/II/III, GM2-gangliosidosis type I, Tay Sachs disease, GM2-gangliosidosis type II, Sandhoff disease, GM2-gangliosidosis, α -mannosidosis types I/II, β -mannosidosis, metachromatic leukodystrophy, mucopolipidosis type I, sialidosis types I/II mucopolipidosis types II/III I-cell disease, mucopolipidosis type IIIC pseudo-Hurler polydystrophy, mucopolysaccharidosis

type I, mucopolysaccharidosis type II, Hunter syndrome, mucopolysaccharidosis type IIIA, Sanfilippo syndrome, mucopolysaccharidosis type IIIB, mucopolysaccharidosis type IIIC, mucopolysaccharidosis type IIID, mucopolysaccharidosis type IVA, Morquio syndrome, mucopolysaccharidosis type IVB Morquio syndrome, mucopolysaccharidosis type VI, 5 mucopolysaccharidosis type VII, Sly syndrome, mucopolysaccharidosis type IX, multiple sulfatase deficiency, neuronal ceroid lipofuscinosis, CLN1 Batten disease, Niemann-Pick disease types A/B, Niemann-Pick disease, Niemann-Pick disease type C1, Niemann-Pick disease type C2, pycnodysostosis, Schindler disease types I/II, Schindler disease, and sialic acid storage disease.

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13. The method of claim 10, wherein the agent is selected from the group consisting of aspartylglucosaminidase, acid lipase, cysteine transporter, Lamp-2, α -galactosidase A, acid ceramidase, α -L-fucosidase, β -hexosaminidase A, GM2-activator deficiency, α -D-mannosidase, β -D-mannosidase, arylsulfatase A, saposin B, neuraminidase, α -N-acetylglucosaminidase 15 phosphotransferase, phosphotransferase γ -subunit, L-iduronidase, iduronate-2-sulfatase, heparan-N-sulfatase, α -N-acetylglucosaminidase, acetylCoA:N-acetyltransferase, N-acetylglucosamine 6-sulfatase, galactose 6-sulfatase, β -galactosidase, N-acetylgalactosamine 4-sulfatase, hyaluronoglucosaminidase, multiple sulfatases, palmitoyl protein thioesterase, tripeptidyl peptidase I, acid sphingomyelinase, cholesterol trafficking, cathepsin K, α - 20 galactosidase B, and sialic acid transporter.